DIEHL
Controls

Installation and user guide
Inverter
7000 R3, 9000 R3, 11000 R3, 14000 R3, 16000 R3

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PLATINUM®

Contents

1	Introduction	5
1.1	PLATINUM R3	5
1.2	About this guide	5
1.3	Symbols used	5
1.4	Symbols on product and packaging	6
2	Safety	7
2.1	Intended usage	7
2.2	Improper usage	7
2.3	Personnel requirements	7
2.4	General safety instructions	7
3	Installation	8
3.1	Scope of delivery	8
3.2	Unpacking	8
3.3	Assembly	9
3.4	Connection	12
4	Initial operation	19
4.1	Switch on	19
4.2	Initial operation	19
4.3	Initial operation menu	20
5	Operation	24
5.1	Display	24
5.2	Operation display	25
5.3	Isolate from generator field (DC isolator)	27
6	Menu	28
6.1	Operate and navigate in the menu	28
6.2	Menu tree	29
6.3	Settings menu	30
6.4	Information menu	32
6.5	Service menu	33

7	Maintenance and cleaning	36
7.1	Maintenance	36
7.2	Cleaning	36
8	Errors and troubleshooting	37
8.1	Error display	37
8.2	Event list	39
9	Technical data	42
10	Taking out of operation	45
11	Disposal	46

1 Introduction

1.1 PLATINUM R3

PLATINUM R3-series inverters are three-phase feed-in inverters for different power ranges; see "Technical data" on page 42.
The PLATINUM network (EIA485) can be used to connect up to 50 PLATINUM inverters to one inverter system.

Options

The following options are available to enhance an inverter or inverter system:
- Remote monitoring/readout with PLATINUM WebMaster
- Evaluation of system data with PLATINUM PV monitor
- Remote controlled AC power reduction via an external monitoring device

1.2 About this guide

This installation and user guide explains how to install and operate PLATINUM inverters of type 7000 R3-MDX, 9000 R3-MDX, 11000 R3-MDX, 14000 R3-MDX, 16000 R3-MDX.

Additional documents

The following additional documents are available in the download area of our website www.diehl.com/photovoltaics:
- Detailed installation and user guide
- Information on fault current protection devices
- Complete event list for detecting/eliminating errors
- Overview of country and grid codes
- Declaration of conformity and certificates
- Manufacturer's warranty from Diehl AKO Stiftung & Co. KG

1.3 Symbols used

1.3.1 Structure of warnings

SIGNAL WORD
Type, source and consequence of the hazard!
► Measures to avoid the hazard.

1.3.2 Hazard levels in warnings

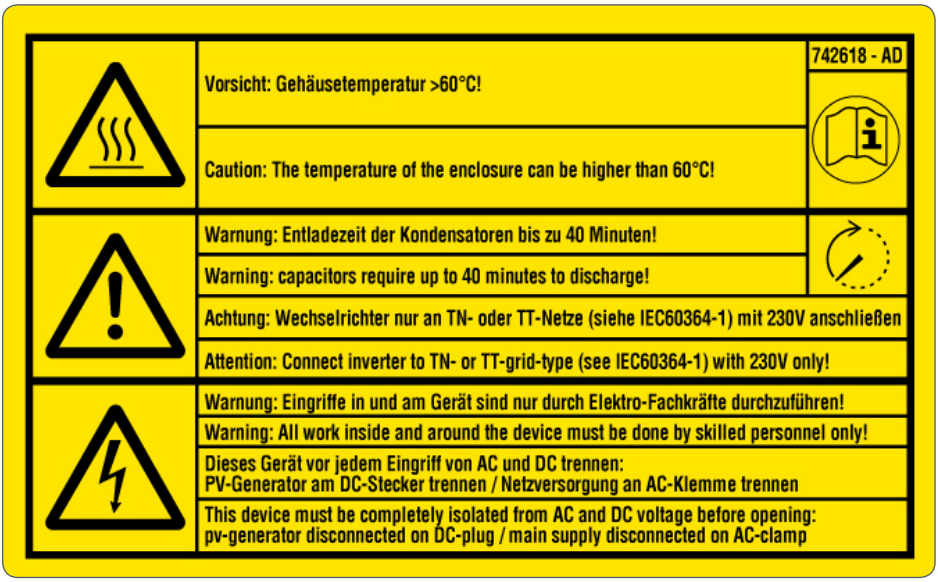
Symbol	Warning word	Probability of occurrence	Consequences of non-observance
	DANGER	Imminent danger	Death, serious injury
	WARNING	Potential danger	Death, serious injury
	CAUTION	Potential danger	Minor injury
–	CAUTION	Potential danger	Damage to property

1.3.3 Notes

Notes give tips on how to work easily and safely or contain further information.

1.4 Symbols on product and packaging

The following label is affixed to the inverter.


742618 - AD
Vorsicht: Gehäusetemperatur >60°C!
Caution: The temperature of the enclosure can be higher than 60°C!
Warnung: Entladezeit der Kondensatoren bis zu 40 Minuten!
Warning: capacitors require up to 40 minutes to discharge!
Achtung: Wechselrichter nur an TN- oder TT-Netze (siehe IEC60364-1) mit 230V anschließen
Attention: Connect inverter to TN- or TT-grid-type (see IEC60364-1) with 230V only!
Warnung: Eingriffe in und am Gerät sind nur durch Elektro-Fachkräfte durchzuführen!
Warning: All work inside and around the device must be done by skilled personnel only!
Dieses Gerät vor jedem Eingriff von AC und DC trennen:
PV-Generator am DC-Stecker trennen / Netzversorgung an AC-Klemme trennen
This device must be completely isolated from AC and DC voltage before opening:
pv-generator disconnected on DC-plug / main supply disconnected on AC-clamp

2 Safety

2.1 Intended usage

- Inverters are to be used solely to feed solar energy converted photovoltaically into the public grid.
- All other usage does not comply with the regulations.

2.2 Improper usage

- The inverters are not to be used in island grids.
- The inverters are not to be used in vehicles.
- The inverters are not to be used in areas at risk of explosion (flour dust, sawdust etc.).
- The inverters are not to be exposed to direct sunlight.
- The inverters are not to be used in areas in which the ammonia content of the air exceeds 20 ppm.
- In the event that the warranty conditions and the information in this installation and user guide are not observed, all warranty claims expire.

2.3 Personnel requirements

The inverter may only be installed and put into operation in accordance with this installation and user guide by trained specialist personnel, for example:

- Service partners authorised by Diehl Controls
- Authorised specialist personnel with knowledge of the applicable guidelines and standards

2.4 General safety instructions

- The inverters are to be used in their original state without independent modifications and in a technically perfect condition.
- Steps must be taken to ensure that the following are adhered to when assembling and connecting the inverter and the PV system:
  - Guidelines and regulations valid in the respective country
  - Provisions of the trade associations, TÜV, VDE (Association for Electrical, Electronic & Information Technologies)
  - Technical connection conditions of the energy supplier responsible
  - National and international regulations and provisions
- Ensure that all protection devices are working correctly.
- Observe conditions of use; see "Technical data" on page 42.

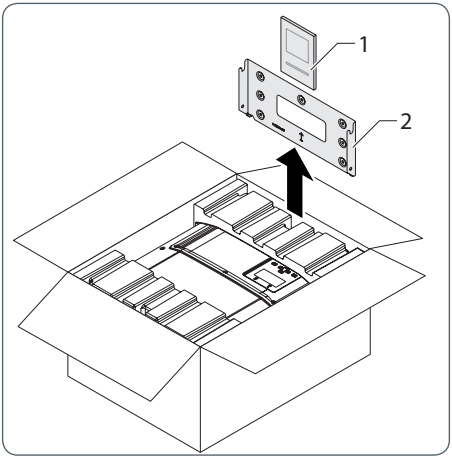
3 Installation

3.1 Scope of delivery

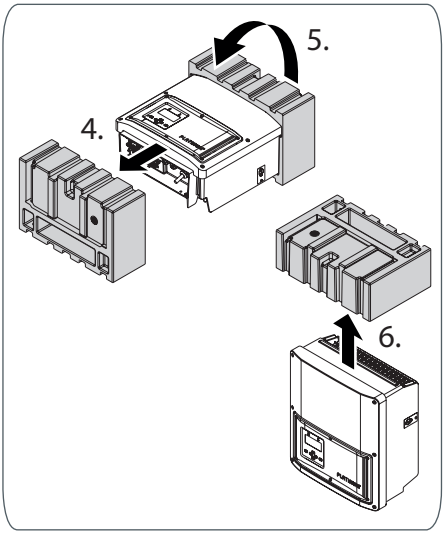
- Inverter
- Wall bracket
- Brief guide

3.2 Unpacking

CAUTION
The inverter weighs 45 kg!
- ▶ Get another person to help you unpack it.
- ▶ Wear safety shoes when unpacking.
- ▶ Ensure that you have firm and secure footing.



1. Open the box.
2. Pull out the brief guide (1) and wall bracket (2) at the side.
3. Remove the inverter (with padding) from the box.



4. Remove the padding from the underside.
5. Set the inverter down.
6. Remove the top padding.

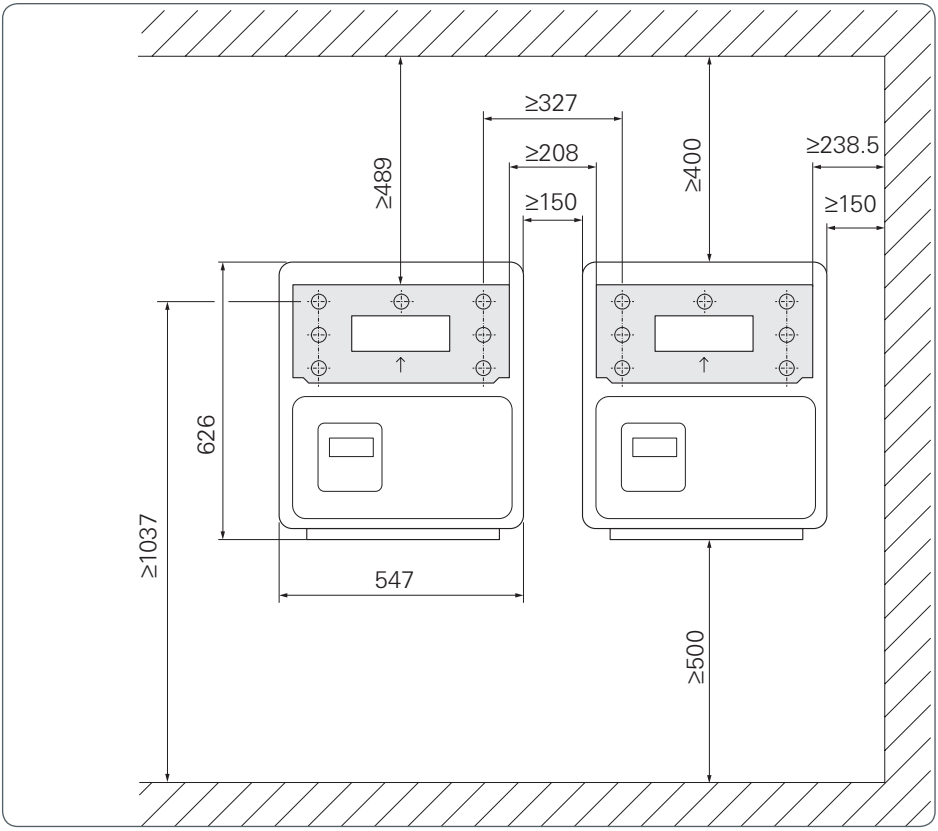
3.3 Assembly

3.3.1 Safety instructions

WARNING
Injury may result if the inverter falls!
- ▶ Use fixing materials suited to the assembly wall and the weight of the inverter.
- ▶ Get a second person to help with assembly and disassembly.
- ▶ Wear safety shoes during assembly and disassembly.
- ▶ Ensure that you have firm and secure footing.

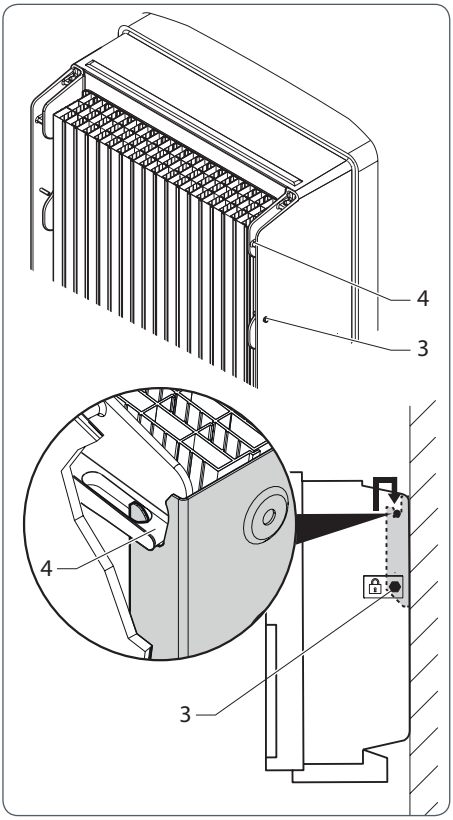
3.3.2 Assembly

Diehl Controls recommends that the inverter not be installed in living quarters.



Dimensions in mm

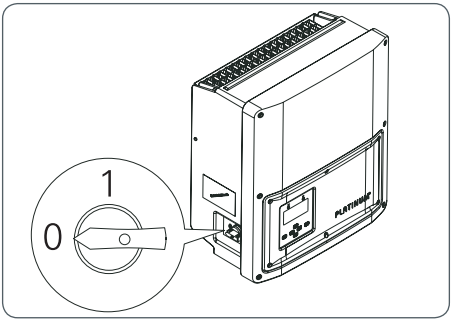
1. Choose the assembly location, taking into account dimensions and distances
2. Fix the wall bracket to the assembly wall with suitable fixing materials.



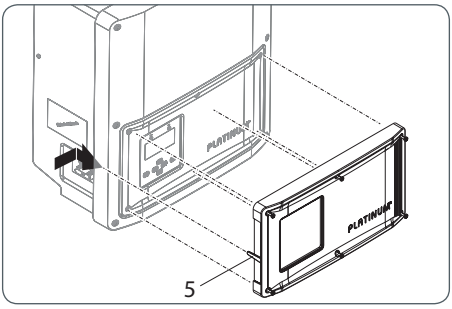
3. Loosen, but do not remove, the safety screws on the sides (3).
4. Hang up the inverter (4), starting from the bottom and moving upwards, by slotting it into the wall bracket.
5. Ensure that the inverter is fitted correctly on the wall bracket.
6. Secure the inverter by tightening the safety screws on the sides.

3.4 Connection

3.4.1 Preparatory work



1. Move the switch knob of the DC isolator to position 0.



2. Loosen 6 screws on service cover.
3. To remove the service cover, push the nose (5) forwards on the side of the handle recess.

3.4.2 Connect the AC voltage

DANGER

Risk of death due to high AC voltage!

- ▶ Switch off the mains voltage supply (AC side) before connecting the inverter (safety).
- ▶ Make sure that the central isolation device can be accessed freely.
- ▶ Only connect the inverter to TN or TT networks (see IEC 60364-1) with 230 V.
- ▶ Observe max. fuse protection permitted on the AC voltage side of 32 A.
- ▶ Diehl Controls recommends a type C cable isolator switch.

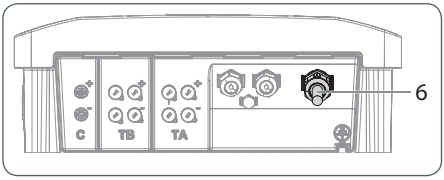
CAUTION
Destruction of the inverter!
► Never mix up the phases with PE or N.

Prepare the connection cable for the AC voltage

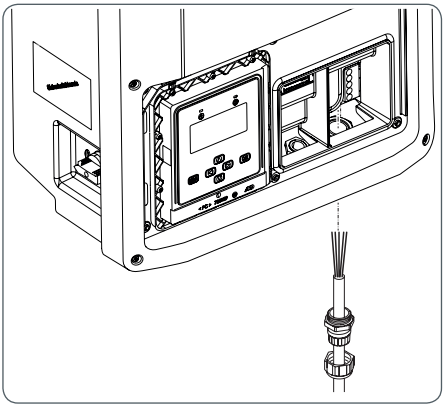
Dimensioning the wire cross section is the responsibility of the electrician and depends on the cable length and installation situation.
- Min. cross section 4 mm²
- Max. cross section 16 mm²

1. Secure the three-phase AC voltage connection lines accordingly; see "Technical data" on page 42.
2. Strip 18 mm of insulation from the AC voltage connection lines and add wire-end sleeves.

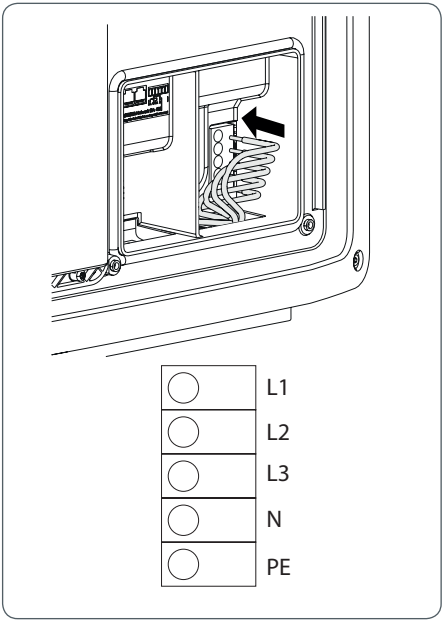
Connection



1. Unfasten the AC screw connection (6) with seal from the underside of the inverter.



2. Direct the prepared AC voltage connection line through the AC screw connection and seal.
3. Feed the AC voltage connection line into the housing from below.
4. Tighten the AC screw connection.



5. Connect the AC voltage connection line in the inverter. To do so, insert the prepared wires in the terminal board.

Terminal		Assignment
L1	black	phase 1
L2	black	phase 2
L3	black	phase 3
N	blue	neutral wire
PE	yellow	protective conductor

3.4.3 Connect DC voltage

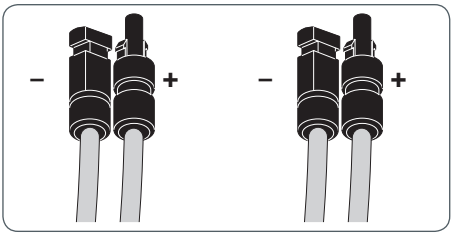
DANGER

Risk of death due to high DC voltage! As soon as the sun shines, voltage is applied to the PV modules.

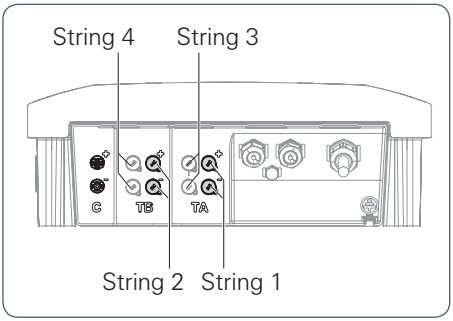
- ▶ Before connecting the inverter, check whether voltage is applied to the generator's DC voltage connection.
- ▶ Before connecting the inverter, check whether the polarity of the DC voltage is correct.
- ▶ If voltage is applied, wear insulating protective clothing and face protection.
- ▶ Ensure that the cable plug has engaged completely with the socket.
- ▶ Detach the DC voltage cable only if the inverter is not in operation.
- ▶ Make sure that the DC isolator or a central isolation device can be accessed freely.
- ▶ Do not earth PV modules. The inverter does not have a transformer.

CAUTION
Damage to property!
- ▶ Use only the original DC voltage Multi-Contact MC4 cable plug.
- ▶ Ensure that the max. DC voltage permitted is not exceeded.
- ▶ Ensure that the max. direct current permitted per string is not exceeded.

- Ensure that the number and type of solar modules and the PV power are the same in every string.
- Always connect an even number of strings:
  - String 1 (TA) and string 2 (TB)
    – or –
  - String 1 and string 3 (TA), string 2 and string 4 (TB)
- The inputs TA and TB must be symmetrically wired.

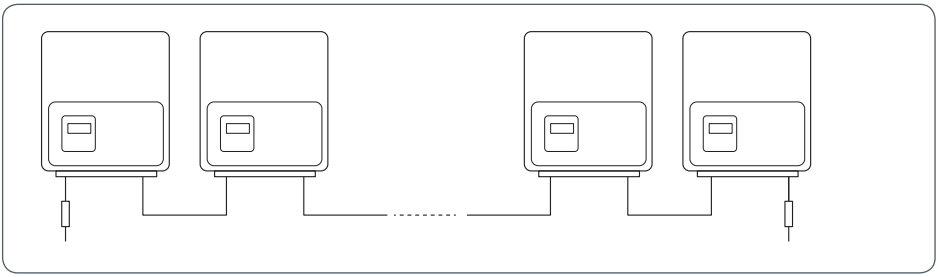


1. Furnish the DC voltage cable for every string with original Multi-Contact MC4 plugs. Make sure that the polarity is correct here.



2. Remove protective caps from the required DC connections.
3. Insert prepared DC voltage connectors in the DC connections, ensuring that the plugs lock in place correctly.
4. To ensure the type of protection, place protective caps on unused plug connectors.

3.4.4 Connecting to the PLATINUM network (EIA 485)

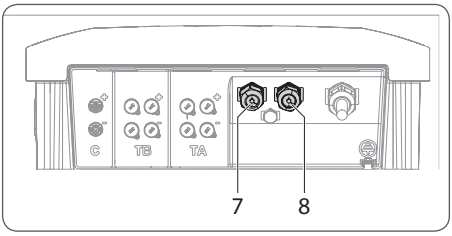


Up to 50 PLATINUM inverters can be connected to a network together with monitoring devices.

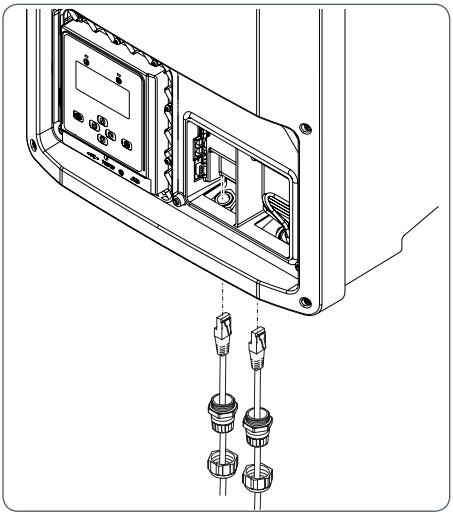
Network cable

- CAT-5 cable with twisted wires and shielding, with prefabricated RJ45 plugs (Pin 3 = B and Pin 6 = A)
  – or –
- Twisted wire pair of a CAT-5 cable

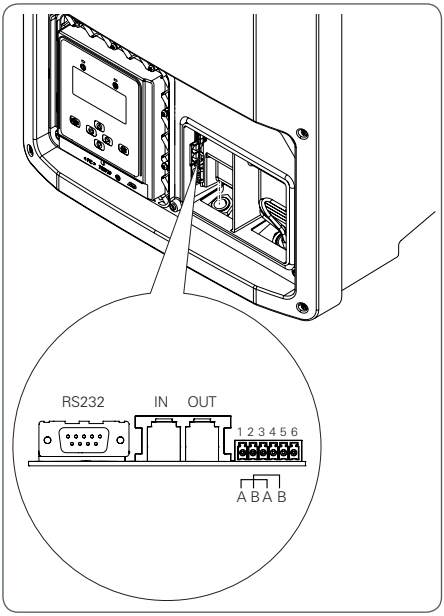
Connection



1. Unfasten the network screw connections (7, IN) and (8, OUT) with seal from the underside of the inverter.



2. Direct the network cable through the screw connection and seal.
3. Feed the network cable into the housing from below.
   Incoming cable (IN): left
   Outgoing cable (OUT): right
4. Tighten the network screw connections.



5. Connect the network cables in the inverter.

CAT-5 cable with RJ45 plug

- Incoming cable: IN socket
- Outgoing cable: OUT socket

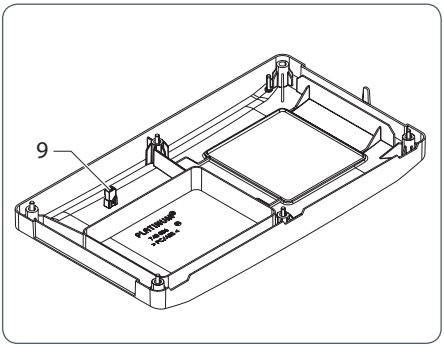
CAT-5 cable with 2 twisted wires

- Incoming cables:
  Cable A: Terminal 1
  Cable B: Terminal 2
- Outgoing cables:
  Cable A: Terminal 3
  Cable B: Terminal 4

→ Ensure that signal lines A and B are not connected incorrectly.

Termination

An integrated terminating resistor can be activated at both open ends of the network (at the first and last inverters).
Terminating ensures that the network functions correctly.



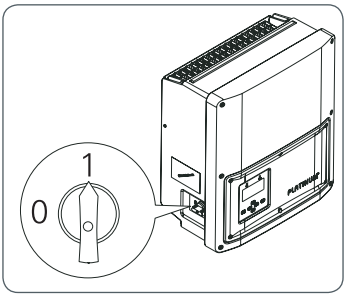
1. Remove the terminating plug (9) from the service cover.
2. Activate termination in the inverter.
   – First participant in the network: Put terminating plug into IN socket
   – Last participant in the network: Put terminating plug into OUT socket

3.4.5 Final tasks

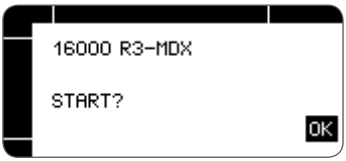
→ Secure the service cover on the inverter with six screws.

4 Initial operation

4.1 Switch on



1. Switch on mains voltage supply (safety).
2. Switch on DC voltage via the DC isolator on the left side of the inverter.



The inverter type appears in the display along with the prompt START?.

4.2 Initial operation

- To transfer all settings correctly, initial operation must be conducted in full once.
- When installing several inverters that are linked with each other via the PLATINUM network (EIA485), initial operation can be performed on any inverter (master programming). For this to be possible, all inverters in the network must be switched on.
- The inverter automatically transfers the setting values to the other inverters via the PLATINUM network (EIA485).
- Every inverter is allocated a number automatically during initial operation. This number can be changed and freely assigned in a further step.
- The inverters on which no data is entered display different screen content depending on the menu. If data cannot be entered, the inverter displays the start screen.
- During initial operation, all inverters connected to the PLATINUM network are blocked.

4.3 Initial operation menu

4.3.1 Overview

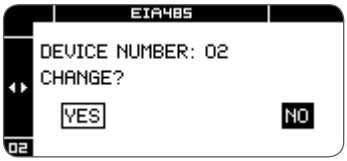
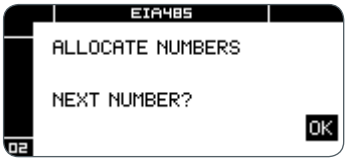
The initial operation menu distinguishes between the initial operation of a device in a new PLATINUM network to be configured and modifications to an existing PLATINUM network (exchange inverter, new configuration).

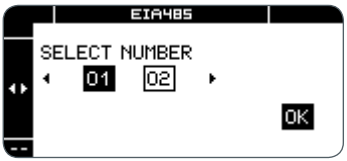
Initial operation	Exchange inverter/new configuration
Start	Start
Language	Language
Network scan	Network scan
Change device number	Exchange inverter
	Reassign numbers
Country code *	Country code *
Date	Date
Time	Time

* The country code can only be changed four hours after initial operation and feed-in starts. This menu will not be displayed later.

4.3.2 Description of the initial operation menu

Changing the date and time can cause saved data to be overwritten or lead to gaps in data logging.
During initial operation, the date and time must be entered correctly once.

Initial operation menu	
Start	Confirm prompt with **OK**.
Language	Select the language required using the ▼/▲ buttons and confirm with **OK**.
Network scan	The inverter scans the PLATINUM network connected and then displays the number of participants and inverters in the network. ▪ If the number of participants and inverters is correct, confirm with **OK**. ▪ If the number of participants and inverters displayed is not correct: – Check the wiring. – Select REPEAT using the ◀/▶ buttons and confirm with OK. The inverter recognises only those network participants that are correctly connected via the PLATINUM network.
Change device number / reassign numbers	During initial operation, the inverter numbers are assigned automatically in the network.  ▪ If the numbers set automatically are to be retained, confirm with **NO** and continue to the next menu option. The automatic numbers for all inverters in the network are transferred. ▪ If different numbering is required, choose **YES** using the ◀/▶ buttons and choose **OK** to open the menu for changing device numbers. The following screen appears on all inverters in the network.  – On the desired first inverter, confirm NEXT NUMBER? with **OK**. The number 1 will be assigned to the inverter. – Confirm NEXT NUMBER? with **OK** for every inverter in the network in the order desired. The next number in each case will be assigned to the inverter.

Exchange inverter	This menu option appears only if a new inverter is detected in an existing network. In this case, the numbers of the inverters replaced can be used. This must be configured on every inverter replaced.  ▪ If the number displayed (of the inverter replaced) is to be used, confirm with YES and continue to the next menu. ▪ If different numbering is required, choose NO using the ◀/▶ buttons and choose OK to open the menu for changing device numbers.
Country code	Select the country required using the▼/▲ buttons and confirm with OK. Further settings may be required depending on the country. These settings depend on the network operator. The country code is automatically applied to all network participants.
Date	Enter the current date. ▪ Use the ▼/▲ buttons to set the digits. ▪ Use the ◀/ ▶ buttons to continue to the next digit. ▪ Choose OK to confirm the date entered.
Time	Enter the current time. ▪ Use the ▼/▲ buttons to set the digits. ▪ Use the ◀/▶ buttons to continue to the next digit. ▪ Choose OK to confirm the time entered. The date and time are automatically applied to all network participants.

The date and time must be confirmed with OK, otherwise initial operation cannot be completed.

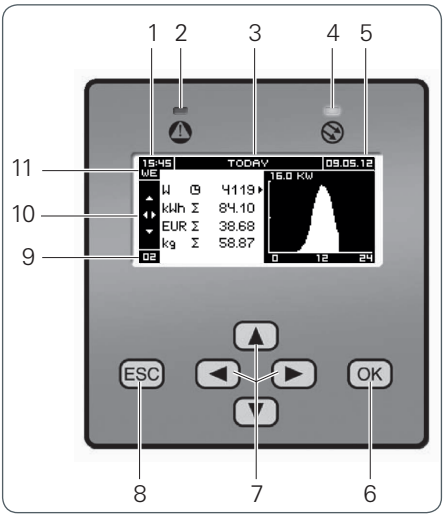
Once the date and time have been entered, the TIME SETTINGS screen appears; see "Settings menu" on page 30.

Depending on the requirements of the network operator, the following additional settings must be made in the service menu; see "Service menu" on page 33:

- Grid support
- Power reduction

5 Operation

5.1 Display



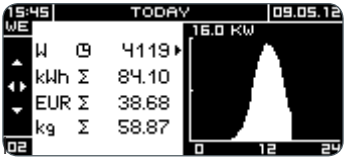
(1) Time in 24-hour format
(2) Alarm LED (red)
(3) Title of the current screen
(4) Operation LED (green)
(5) Date
(6) **OK** button
(7) Navigation buttons
(8) **ESC** button
(9) Inverter number
(10) Scroll arrows (vertical and horizontal)
(11) Week day

The scroll arrows show which navigation buttons can be used to navigate on the current screen.

Meaning of the LEDs

Alarm LED (2)	
LED off	▪ Normal operation
LED flashes	▪ Error
Operation LED (4)	
LED lit up	▪ Feed-in mode
LED flashes	▪ Preparation for feed-in
LED off	▪ Inverter not in feed-in mode
Both LEDs flash at same time	
The inverter is running a network scan or making parameter settings.	

5.2 Operation display



During normal operation, the operating mode is displayed. The power data is shown in a table and graph. In this way, the operation display provides an overview of the feed-in process and the yield of the PV system.

5.2.1 Navigating in the TODAY operation display

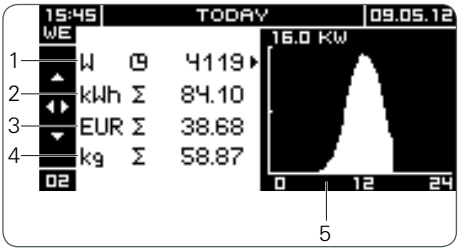
▼/▲ buttons — Switch between screen 1 and 2 (TODAY) and ACTUAL operation display.

◀/ ▶ buttons — Switch between time periods (TODAY) or between ACTUAL 1 and ACTUAL 2

5.2.2 TODAY operation display

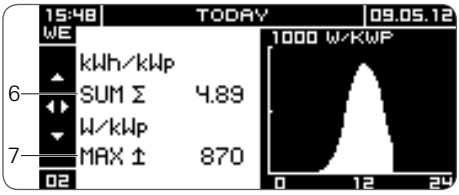
The TODAY operation display is divided between two screens that can be displayed for different time periods.

Screen 1: Absolute power data



(1) Current power
(2) Total energy fed in today
(3) Total feed-in rebate generated today
(4) Total CO_2 saved today
(5) Feed-in progress today

Screen 2: Standardised power data (if configured)



(6) Standardised yield generated for the period displayed; in the example: yield generated today
(7) Maximum standardised power achieved today

The values displayed by the inverter may differ from those displayed on calibrated electricity meters.

Display of other time periods

The inverter stores the power data for the total operating time. The following periods can be displayed:

- Today
- Current week
- Current month
- Current year
- Since initial operation
- Yesterday
- Previous week
- Previous month
- Previous year

Standardised power data can only be displayed for the periods "Today", "Yesterday" and "Since initial operation".

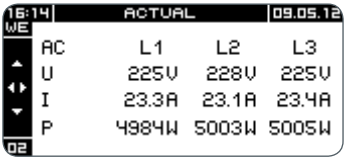
Differing display in other time periods

- The current power value (W ◷) is only displayed for the TODAY period and if energy is currently being fed in. In all other periods, and when energy is not being fed in, the maximum value (W ↑) is displayed.
- Feed-in rebate >999,000 is displayed exponentially.
  - Example: EUR 1,234,567 is displayed as 1.234E6 (=1.234 x 10^6)
- The progress of the power feed-in is only displayed for the TODAY and YESTERDAY periods. In all other periods, the energy fed in is displayed for each time interval.
  - Each day is represented by one bar in the weekly display (Mon. – Sun.).
  - Each day is represented by one bar in the monthly display (1st – 31st).
  - Each month is represented by one bar in the yearly display (Jan. – Dec.).

5.2.3 ACTUAL operation display

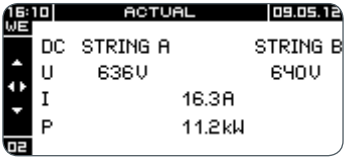
The ACTUAL operation display is divided between two screens.

Screen 1: AC side



The three phases of the AC side are displayed.

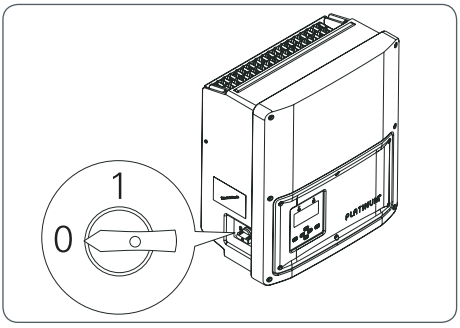
Screen 2: DC side



The inputs TA and TB of the DC side are displayed.

5.3 Isolate from generator field (DC isolator)

The DC isolator on the left side of the inverter enables the solar generator to be switched on and off.



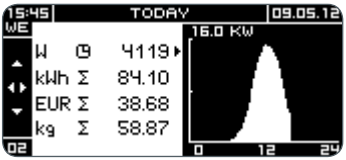
Position 0: Solar generator switched off
Position 1: Solar generator switched on

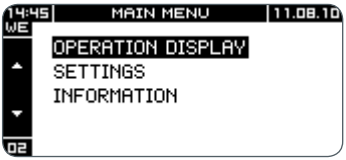
- Diehl Controls recommends activating the DC isolator once a year to prevent the contacts from fusing together.
- Diehl Controls recommends switching off the mains voltage (AC) before switching off the DC isolator to minimise wear to the contacts.

6 Menu

6.1 Operate and navigate in the menu

6.1.1 Call up menu





1. Press **ESC** on the operation display.

   The main menu is displayed.
   OPERATION DISPLAY is selected.
2. Use the ▼/▲ buttons to select the menu required, e.g. SETTINGS.
3. Open the menu selected by choosing **OK**.
   The associated submenus are displayed.

6.1.2 Menu operation

> The scroll arrows available in the current menu are shown in the black bar on the left.

Button	Meaning
▼/▲	▪ Select from a list ▪ If entering information: increase/decrease value
◀/▶	▪ Switch between alternatives, e.g. YES/NO, BACK/SELECT ▪ To the next/previous/superordinate parameter ▪ If entering information: to the next/previous digit
ESC	▪ Back to the main menu without making changes
OK	▪ Select setting and back to the main menu ▪ Open selected submenu

6.2 Menu tree

Operation display	See "Display" on page 24		
Settings	Time settings	Date / time	
		Date format	DD-MM-YYYY, MM-DD-YYYY, YYYY-MM-DD
		Daylight saving	Manually, automatically
	Language	Deutsch, English, Italiano, Español, Nederlands, Français	
	Alarm volume	0 ... 3	
	LCD	Contrast	0 ... 63
		Brightness	0 ... 9
	Rebate		
	System		
	Plant size		
	Standardisation		
	Meter 2		
Information	Operating data		
	System data		
	Inverter type		
	Inverter version		

The menu options are described in tables below.

6.3 Settings menu

Time settings		
Date / time	▪ Enter date and time in the format shown. ▪ If changing to daylight savings time manually, the following prompt appears: DAYLIGHT SAVING YES/NO. – YES One hour is added to the time set. – NO The time already set is used. ▪ Before the new values are selected, a security prompt is shown.	
Date format	▪ Select date format. Possible date formats: DD-MM-YYYY, MM-DD-YYYY, YYYY-MM-DD	
Daylight saving	MANUALLY	Switch to daylight saving/wintertime manually. When the date and time are next entered, the DAYLIGHT SAVING YES/NO prompt appears.
	AUTOMATICALLY	Automatic switch to daylight saving/wintertime according to the country set

▪ Changing the date and time can cause saved data to be overwritten or lead to gaps in data logging.
▪ The inverter transfers the time settings to all network participants automatically.

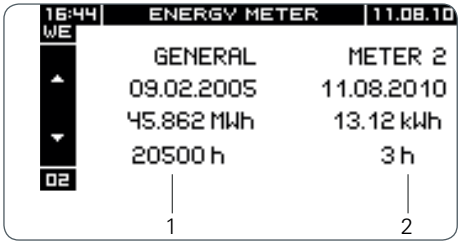
Language	
German English Italiano Español Nederlands Français	▪ Select the language required. The inverter transfers the language set to all network participants automatically.

Volume	
0 ... 3	▪ Set the alarm volume for the built-in buzzer on this inverter. Possible values: 0 ... 3 Factory setting: 0 (alarm off)

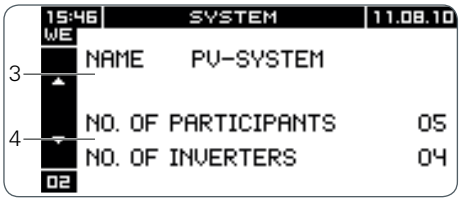
LCD	
Contrast	▪ Set the display contrast. Possible values: 0 ... 63
Brightness	▪ Set the display brightness. Possible values: 0 ... 9
Feed-in rebate	
Currency	▪ Enter currency of the country, max. three characters.
Value / kWh	▪ Enter rebate per fed-in kWh in the format shown.
System	
Name	▪ Assign the system (network with several inverters) one name (max. 18 characters).
Description	▪ Specify the system further by means of a description (max. 18 characters).
Plant size	
Power system	▪ Enter power installed in the entire network. A security prompt appears: "System size ..."
Standardisation	
kWpeak	▪ Enter the max. power of the PV modules connected to this inverter in kW. This provides a reference value to assess the power of the PV system.
Meter 2	
	Meter 2 counts the energy fed in since the last reset.
Back	▪ Do not reset meter 2.
Reset	▪ Reset meter 2.

6.4 Information menu

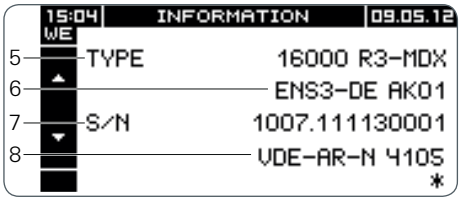
The Information menu offers the following info screens:



(1) Total energy since initial operation date and number of operating hours
(2) Energy since the last reset and number of operating hours



(3) Name and description (if available) of the system
(4) Number of participants and inverters in the PLATINUM network



(5) Type information
(6) ENS version *
(7) Serial number
(8) Configured standard

(9) Firmware version
(10) PLATINUM Network version

* ENS = Device for monitoring the network with allocated control elements

6.5 Service menu

6.5.1 Call up service menu

1. Call up the main menu with the ESC button.
2. Select the Settings menu with the ▲/▼ buttons and confirm with OK.
3. Hold both the ◀ and ▶ buttons down together for around three seconds.
   The service menu is displayed and the Event list menu option is selected.
4. Select the menu required using the ▲/▼ buttons.

6.5.2 Overview of the service menu

Event list	See section 8.2
Parameters	See section 6.5.3
Initial op. date	Show initial operation date
Energy meter	Show energy fed in since initial operation
New configuration	See section 4.3
MPP mode	See section 6.5.4
Grid support *	See section 6.5.5
Power reduction *	See section 6.5.6

* The country code can only be changed four hours after initial operation and feed-in starts. This menu will not be displayed later.

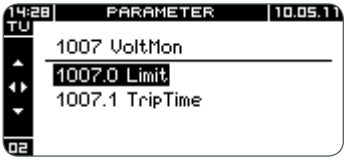
6.5.3 Parameters service menu

In some supply areas, the values for supply voltage and frequency sometimes or always differ from the factory settings. PLATINUM inverters can be adapted to these values. For more information, contact the PLATINUM service.
The Parameters service menu shows the parameters set, the country code and the valid guidelines. The parameters are structured in several levels, with the specific value displayed on the lowest level.

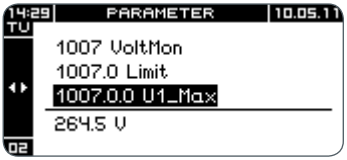
Parameters can only be modified by certified persons with the PLATINUM service tool.

Example: Parameter 1007 VoltMon (voltage monitoring)

Parameter 1007



Parameter 1007
- with submenus 1007.**0** and 1007.**1**



Parameter 1007
- with submenus 1007.0 and 1007.0.**0**
- with the current value for 1007.0.**0**

6.5.4 MPP-Mode service menu

MPP mode	
Default	▪ Default MPP mode for free module surface
Shadow mode	▪ For systems with shadowing (e.g. through trees), the MPP area is frequently subject to complete scans.

In MPP Shadow mode, the ideal yield may not be achieved because only a little energy is fed in during the MPP search.

6.5.5 Grid Support service menu

Grid support	
Remote	In this setting, grid support is set by a remote device (e.g. PLATINUM WebMaster).
Cosine Phi	Enter cosine phi. ▪ Cosine Phi 0.707 ... 1 ▪ Type Capacitive (over-excited), inductive (under-excited) ▪ Phi Associated angle
Reactive power	Enter the reactive power. ▪ % P_Nom 0 ... 50 ▪ Type Capacitive (over-excited), inductive (under-excited) ▪ Reactive power Associated reactive power
Cosine Phi(P)	In this setting, cosine phi is configured according to the specifications defined in the PLATINUM inverter.
Q(U)	Mains voltage-dependent reactive power regulation ▪ 102.0% is typical.

6.5.6 Power Reduction service menu

Power reduction	
Maximum power	Enter the maximum power for this inverter according to the specifications of the network operator.

7 Maintenance and cleaning

DANGER
Risk of death due to electric shock!
- ▶ Only allow inverters to be opened by the PLATINUM service or by service partners authorised by Diehl Controls.

DANGER
Risk of death due to high DC and AC voltages!
- ▶ Wear insulating protective clothing and face protection.
- ▶ Maintenance and cleaning is to be performed only by trained specialist personnel.
  The trained specialist personnel must be granted permission by the energy provider responsible.

Before every maintenance or cleaning task:
- ▶ Switch off mains voltage supply (safety).
- ▶ Set the switch knob of the DC isolator to 0.
- ▶ Wait at least 40 minutes until the capacitors are discharged.
- ▶ Make sure that no voltage is applied to the DC cables.

7.1 Maintenance

The inverter is maintenance-free.

7.2 Cleaning

CAUTION
Destruction of the inverter!
- ▶ The inverters must not be cleaned with a steam cleaner.

To ensure cooling, clean the ventilation slots regularly with
- a vacuum cleaner
- soft brush
- pressured air

8 Errors and troubleshooting

8.1 Error display

Three different types of error are displayed on the inverter:
- Serious errors
- Blocking errors
- Non-blocking errors

As long as an error is displayed, the event list can be called up by pressing the ▶ button; see Page 39.

8.1.1 Serious errors

WARNING
Destruction of the inverter due to serious error!
- ▶ Switch off AC voltage.
- ▶ Switch off DC voltage: set the DC isolator to 0.
- ▶ Inform the PLATINUM service. Have the error code and serial number to hand.

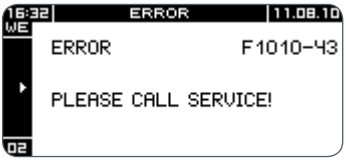
Example of a serious error

When a serious error is displayed:
1. Follow the instructions on the inverter.
2. To exit the error display, press the ▶ button.
   The event list is displayed.
3. Exit the event list by pressing the ESC button.

8.1.2 Blocking errors

DANGER
Risk of death due to electric shock!
▶ Blocking errors are only to be rectified by service partners authorised by Diehl Controls.

Example of a blocking error



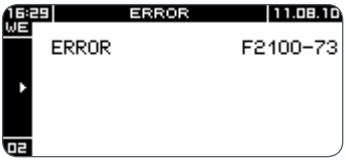
- The inverter is permanently switched off.
- The inverter raises a visual alarm (red LED flashes).
- The inverter raises an acoustic alarm.

When a blocking error is displayed:
1. Follow the instructions on the inverter.
2. To stop the acoustic alarm, press any button.
3. To exit the error display, press the ▶ button.
   The event list is displayed.
4. Exit the event list by pressing the ESC button.
   The initial operation screen is displayed. The red LED continues to flash as long as the error remains.

8.1.3 Non-blocking errors and warnings

Non-blocking errors occur temporarily (e.g. overvoltage on the grid). The inverter switches off automatically and remains switched off until the cause of the error no longer exists. Once the error has been rectified, the inverter automatically reverts to normal operation.

Example of a non-blocking error



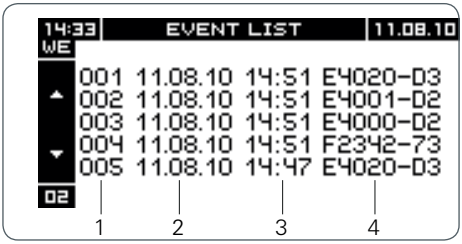
The red LED flashes at the same time as long as the error exists.

Stop alarm
1. To exit the error display, press the ▶ button.
   The event list is displayed.
2. Exit the event list by pressing the ESC button.

8.2 Event list

The Event list in the service menu (see Page 33) displays the last 100 events detected.

Structure of the event list



(1) Sequential numbers
(2) Date
(3) Time
(4) Error code

- The complete event list can be downloaded from our website www.diehl.com/photovoltaics.
- When making contact with the PLATINUM service, have the serial number and event code to hand.
- To exit the event list, press the **ESC** button.

No.	Meaning	Measure
Serious errors		
900	AC voltage too high	▪ Isolate inverter from network ▪ Check AC connection
910	DC voltage too high	▪ Isolate inverter from network ▪ Isolate inverter from DC connection ▪ Check inverter for damage ▪ Check the module connections
920	DC connection has incorrect polarity	▪ Set DC isolator to 0 ▪ Check DC connection
930	Isolation error between PV+ and earth / PV– and earth	▪ Check isolation of PV modules ▪ Check isolation of PV cables

No.	Meaning	Measure
Blocking errors		
1000 ... 1030	Blocking system error	▪ Isolate inverter from network ▪ Put inverter back into operation If measures prove unsuccessful: ▪ Inform service
1040	DC voltage too high	▪ Check module connection
1050	DC connection has incorrect polarity	▪ Set DC isolator to 0 ▪ Check DC connection
1060 ... 1290	Blocking system error	▪ Isolate inverter from network ▪ Put inverter back into operation If measures prove unsuccessful: ▪ Inform service
1300	L and N connections mixed up	▪ Check L and N connection on AC plug
1310 ... 1990	System error	▪ Isolate inverter from network ▪ Put inverter back into operation If measures prove unsuccessful: ▪ Inform service
Non-blocking errors		
2010	Amplitude limit for feed-in phase exceeded or undershot	▪ Arrange for voltage amplitude of feed-in phase to be checked
2020 ... 2040	Grid amplitude error phase-to-phase voltage	▪ Ensure that all safety devices are switched on ▪ Ensure that all three phases are connected
2080	Network fault on feed-in phase (voltage peak)	If this occurs frequently: ▪ Arrange for all contacts and safety devices to be checked, from the service connection to the inverter ▪ Arrange for the network quality to be checked
2100 2110	Mains frequency limit exceeded or undershot	If the inverter is supplied with emergency power from a different mains frequency: ▪ No measures required

No.	Meaning	Measure
2120 ... 2190	Diagnosis support in service situation	▪ Inform service of error code if required
2200 ... 2240	Measured temperature too high	▪ Check ventilation openings
2300 ... 2330	Temperature sensor defective	▪ Inform service
2340 ... 2890	Diagnosis support in service situation	▪ Inform service of error code if required
2900	Subsequent error during network fault or excess temperature	▪ No measures required
2910 ... 2990	Diagnosis support in service situation	▪ Inform service of error code if required
Warnings		
3000 ... 3990	Diagnosis support in service situation The inverter stores the warning in the event list	▪ Inform service of error code if required
Information		
4000 ... 4990	Diagnosis support in service situation The inverter stores the warning in the event list	▪ Inform service of error code if required

9 Technical data

Input variables	7000 R3
Max. PV power	6,700 Wp
Max. DC power (cos φ = 1)	6,100 W
PV voltage range, M P P T	350 – 720 V
Max. DC voltage	900 V
Max. input current	2 x 10 A
Number of string inputs	2 x 2
Number of MPP trackers	1
Short circuit current	14 A
Earth connection monitoring	Isolation check
Output variables	**7000 R3**
Rated AC power (cos φ = 1)	6,000 W
Rated AC current intensity	8.7 A
Max. apparent power	6,000 VA
Max. AC current intensity	11.2 A
Max. short circuit current	117.4 A
Switch-on current	1.54 A
Feed-in operation begins from ...	20 W
Mains voltage working range	3AC 230 V / 400 V + N (+/– 20 %)
Feed-in / monitoring phases	3 feed-in phases / 3 monitoring phases
Max. network impedance permitted (Z_{max})	–
Internal use over night	< 2 W
Mains frequency	50 Hz (+/– 5 %)
Short-circuit strength	Yes
Power factor (cos φ)	0.7 ind ... 0.7 cap
Earth connection monitoring	AFI
Efficiency	**7000 R3**
Max. efficiency	98.4 %
Euro efficiency	97.7 %
Type name	**7000 R3-MDX**

9000 R3	11000 R3	14000 R3	16000 R3
9,000 Wp	11,200 Wp	14,600 Wp	16,900 Wp
8,200 W	10,200 W	13,300 W	15,350 W
350 – 720 V			
900 V			
2 x 13 A	2 x 16 A	2 x 21 A	2 x 24 A
2 x 2			
1			
18 A	22 A	29 A	33 A
Isolation check			
9000 R3	11000 R3	14000 R3	16000 R3
8,000 W	10,000 W	13,000 W	15,000 W
11.6 A	14.5 A	18.9 A	22.0 A
8,000 VA	10,000 VA	13,000 VA	15,000 VA
14.8 A	18.5 A	22.0 A	22.0 A
117.4 A			
1.54 A			
20 W			
3AC 230 V / 400 V + N (+/– 20 %)			
3 feed-in phases / 3 monitoring phases			
–	–	402 mΩ	345 mΩ
< 2 W			
50 Hz (+/– 5 %)			
Yes			
0.7 ind ... 0.7 cap			
AFI			
9000 R3	11000 R3	14000 R3	16000 R3
98.4 %			
97.8 %	97.9 %	98.0 %	98.0 %
9000 R3-MDX	11000 R3-MDX	14000 R3-MDX	16000 R3-MDX

Interfaces	... R3
DC input	Multi-Contact MC4
DC isolation device	Switch integrated in inverter for isolation from generator field
Reverse voltage protection (DC)	Yes
AC output	Spring terminal
PLATINUM network	EIA 485, 2 x RJ45 Western Modular, add. plug with screw terminals
Service interface	EIA 232, SubD 9-pole socket
Ambient conditions	**... R3**
Operating temperature range	–20 °C to +60 °C
Max. temperature for rated power	+45 °C
Storage temperature	–25 °C to +80 °C
Max. humidity	95 %
Protection class	IP65 in accordance with DIN EN 60529
Contamination level	II, external and internal use possible
Inverter data	**... R3**
Dimensions (H x W x D)	629 x 547 x 290 mm
Weight	45 kg
Switching concept	Transformerless, DIVE, RACE, ENS in accordance with VDE 0126-1-1
Cooling concept	Convection cooling
Protection class / overvoltage protection	I / III
Overvoltage category	DC side: II AC side: III
Optical display	Full graphic LCD, 170 x 76 pixels
Integrated datalogger	Storage capacity sufficient for operating time of 30 years

The technical data is valid for a maximum height of 2,000 m above sea level.

10 Taking out of operation

DANGER

Risk of death due to high DC and AC voltages!

- ▶ Wear insulating protective clothing and face protection.
- ▶ Inverters are only to be uninstalled by trained specialist personnel. The trained specialist personnel must be granted permission by the energy provider responsible.
- ▶ Switch off mains voltage supply (safety device).
- ▶ Set the switch knob of the DC isolator to 0.
- ▶ Wait at least 5 minutes until the capacitors are discharged.
- ▶ Make sure that no voltage is applied to the DC cables.

WARNING

Injury may result if the inverter falls!

- ▶ Get a second person to help with assembly and disassembly.
- ▶ Wear safety shoes during assembly and disassembly.
- ▶ Ensure that you have firm and secure footing.

The procedure for taking inverters out of operation is the reverse of that for installation and assembly.

11 Disposal

- Packaging and replaced parts are to be disposed of in accordance with the regulations of the country in which the inverter was installed.
- Do not dispose of PLATINUM inverters in household waste.

- Diehl Controls takes back complete PLATINUM inverters.
- PLATINUM inverters can be disposed of via municipal waste management for electrical devices.

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